

Test # 1 for Math 26600 (Fall 2020)

Please show your work.

Please print your names:

- 1) (10 points) Solve the given differential equation. $\frac{dy}{dt} = \frac{2ye^{-2t}}{4-3y^2}$

Please turn over for Problem 2

2)(10 points) Sketch the phase line for the given DE. Identify the equilibrium points as sink, source, or node.

$$y' = y^2 - 2y - 3$$

Please turn over for Problem 3

3)(10 points) Locate the bifurcation value for the one-parameter family of DEs and draw a typical phase line for values of the parameter smaller than, larger than, and at the bifurcation value. $\frac{dy}{dt} = \mu y^2 - y^3$

Please turn over for Problem 4

4)(10 points) Find the general solution to the following linear DE.

$$\frac{dy}{dt} = 2y + e^t$$